

Properties and Changes in Matter

2-4 The student will demonstrate an understanding of the properties of matter and the changes that matter undergoes. (Physical Science)

2.4.3 Explain how matter can be changed in ways such as heating or cooling, cutting or tearing, bending or stretching.

Taxonomy level: 2.7-B Understand Conceptual Knowledge

Previous/Future knowledge: In 2nd grade (2-2.4), students exemplified matter that changes from a solid to a liquid and from a liquid to a solid. This is foundational knowledge that will be further developed in 3rd grade (3-4.2) when students explain how water and other substances change from one state to another (including melting, freezing, condensing, boiling, and evaporating). In 7th grade (7-5.10), students will compare physical changes (including changes in size, shape, and state) to chemical changes that are the result of chemical reactions (including changes in color or temperature and formation of a precipitate or gas).

It is essential for students to know that matter can be changed in many different ways.

Heating For example, when you heat butter, it melts

Cooling For example, when you cool water, it freezes to ice

Cutting For example, when you cut meat, it changes from one piece to many pieces

Tearing For example, when you tear paper, it changes from one piece to many pieces

Bending For example, when you bend metal, it changes shape like bending a paperclip could make it straight instead of curvy

Stretching For example, when you stretch modeling clay, it becomes thin

It is not essential for students to explain the chemical changes that occur as things are heated or cooled.

Assessment Guidelines:

The objective of this indicator is to *explain* how matter can be changed; therefore, the primary focus of assessment should be to construct a cause-and-effect model of the various ways that matter is affected by heating or cooling, cutting or tearing, bending or stretching. However, appropriate assessments should also require students to *recall* that heating or cooling, cutting or tearing, bending or stretching matter are all ways to change matter.